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EXAMINER

NGUYEN, VU ANH

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1796

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ELECTRONIC

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DETAILED ACTION

Response to Amendment

1. This Office action is in response to the amendment filed 03/26/2010, wherein claims **41-44, 47-49, 52-63, 66-73, 76-78, 81-92 and 95-107** are pending. The following claims are independent claims: 41, 57, 58, 59, 60, 66, 70, 86, 87, 88, 89 and 95.

Allowable Subject Matter / Response to Arguments

2. The indicated allowability of claims 51, 57-59, 65, 66, 80, 86-88, 94 and 95 is withdrawn due to the following reason. In previous Office action, the examiner inadvertently overlooked some important indefiniteness issues in these claims and misinterpreted the claims. These issues will be discussed below. Consequentially, this Office action is non-final.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

4. Claims 60 and 66 are objected to because of the following informalities: In the mid-section of each of pages 20 and 25, an appropriate punctuation mark should be inserted after "with 1 to 8 carbon atoms" to separate out the ensuing wherein clause. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 41-44, 47-49, 52-63, 66-73, 76-78, 81-92 and 95-107 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. First, the recitation of "at least one anionic monomer having...; at least one cationic monomer; **a combination thereof**; and at least one of..." in the independent claims 41, 57, 58 and 59, and the recitation of "at least one anionic monomer having...; at least one cationic monomer; **or a combination thereof**; and at least one of..." in the independent claims 70, 86, 87 and 88 make the composition of the polymer very ambiguous. That is, it is not clear whether the polymer comprises a monomer selected from a group which contains an anionic monomer and a cationic monomer or the polymer comprises an anionic monomer AND a cationic monomer. The language "at least one anionic monomer having...; at least one cationic monomer" seems to suggest that the polymer has both the anionic monomer and the cationic monomer

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whereas the phrase “[or] a combination thereof” and the language of claims 60, 66, 89 and 95 seem to point to a polymer having at least a monomer selected from a group that contains an anionic monomer and a cationic monomer. Thus, claims 41, 57, 58, 59, 70, 86, 87 and 88 and their dependent claims are ambiguous. In the Claim Rejection over Prior Art section below, the polymer in claims 41, 57, 58, 59, 70, 86, 87 and 88 are understood to comprise **not necessarily both** an anionic monomer and a cationic monomer.

8. Second, all the independent claims have a chemical structure (A) with substituents R₁, R₂, R₄-R₇ and a chemical structure (I) with substituents R₁ and R₂. Thus, when one refers to the R₁ or R₂ substituent in these claims, such reference will be ambiguous. An example of such ambiguity occurs in claims 43 and 72. Analogously, in independent claims 57, 58, 59, 60, 66, 86, 87, 88, 89 and 95, the chemical structure (IIa) has substituents R₄-R₇ and moieties A and B whereas the chemical structure (IIb) also has moieties A and B. Thus, when one speaks of any of the substituents R₄-R₇ in these claims, it would be confusing since it is not specified if the substituent is that of the structure (I) or that of structure (IIa). Likewise, a reference of moiety A or B in these claims would also be ambiguous as to whether such A or B is that of structure (IIa) or that of structure (IIb).

9. Third, in independent claims 41, 57, 58, 59, 70, 86, 87 and 88, the recitation of the “at least one cross-linking monomer” without an indented line makes the composition of the polymer ambiguous. That is, it is unclear as to whether said cross-linking monomer belongs to the group starting with the nonionic monomer of formula (I)

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or stands outside of said group and on equal footing with the group that contains the anionic monomer and the cationic monomer. The grouping of the monomers is more confusing in claims 87 and 88 due to the way the lines are indented.

10. Finally, the followings are noted: the R_3 in claims 43-72 lacks an antecedent basis (it should be changed to R_3'); the R in line 1 of claims 48 and 77 lacks antecedent basis (it should be changed to R"); in claims 53 and 82, the use of "vinyl ester" for vinylpyrrolidone, styrene and alpha-methylstyrene is highly inappropriate as these chemical species are not vinyl esters; in claims 54 and 83, the classification of crotonic acid, isocrotonic acid and cinnamic acid as being dicarboxylic acids is highly inappropriate as these acids are monocarboxylic acids; and in claims 55 and 84, the phrase "or a combination thereof" makes the claims unclear since the cationic monomer is already recited to be at least one member selected from a specified group.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 70-73, 76-78, 81-92 and 95-107 are rejected under 35 U.S.C. 102(b) as being anticipated by Egraz et al. (US 6,093,764).

13. Regarding the limitations set forth in these claims, Egraz et al. (Egraz, hereafter) discloses a polymer, a method of its preparation, a method of dispersing mineral

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substances in aqueous media using said polymer, and a use of said dispersion/suspension in paper industry (col. 1, lines 5-16), wherein said polymer, apparently a random copolymer, is prepared from a monomer mixture comprising 10-99 wt% of at least a monomer (a), 0-50 wt% of at least a monomer (b), 0-50 wt% of at least a monomer (c), and 1-90 wt% of at least a monomer (d) (col. 5, lines 42-57). The method of preparing the polymer includes any method of radical polymerization (col. 5, lines 58-62). The monomer (a) and monomer (b) comprise the species being claimed as "anionic monomer" (col. 4, lines 15-35). Monomer (c) includes such species as alkyl (meth)acrylates, (meth)acrylonitrile, vinyl acetate, vinylpyrrolidone, (meth)acrylamide, dimethylaminopropyl (meth)acrylamide, glycol esters of (meth)acrylic acid, methacrylamido-propyltrimethyl-ammonium chloride, dimethyldiallylammonium chloride, and others (col. 4, lines 35-51). Monomer (d) comprises species of the monomer being claimed under formula (I) (col. 3, lines 35-65). The copolymer is apparently water-soluble as it is neutralized and forms a solution in aqueous media (col. 5, lines 63-67; col. 6, lines 26-35). In at least one example, the polymer comprises 85 wt% of acrylic acid and 5 wt% of acrylamide (col. 27, lines 29-35). Such polymer reads on the claimed polymer which comprises at least one anionic monomer such as acrylic acid and at least one monomer selected from a group that contains acrylamide. The amount of the polymer in the dispersion is 0.05-5% dry weight relative to the dry weight of the mineral substances (col. 7, lines 28-33). The preparation of the dispersion/suspension involves crushing and grinding (col. 6, lines 20-24; col. 7, lines 3-19). The mineral substances include many of the species being claimed (col. 6, lines 53-61). The disclosed polymer

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is directed to the following objectives: (1) the polymer should serve as a good dispersing agent/crushing aid for mineral particles having hydrophobic surface as well as those with hydrophilic surface, and (2) it enables a preparation of a dispersion/suspension with a high load of mineral substances without a high increase in viscosity (col. 1).

14. It is noted that claims 70-73, 76-78, 81-92 and 95 are product-by-process claims where the polymer is prepared by controlled polymerization using a particular alkoxyamine initiator. Although the prior art polymer is not produced by the claimed process, it has been held that “[e]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process”, *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). Further, “although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product”, *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir.1983). See MPEP 2113.

Therefore, absent evidence of criticality regarding the presently claimed process, Egraz meets the requirements of the present claims.

15. Claims 70-73, 76-78, 81-92 and 95-107 are rejected under 35 U.S.C. 102(b) as being anticipated by Gonnet et al. (US 4,775,420).

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16. Corresponding to the limitations set forth in these claims, Gonnet et al. (Gonnet, hereafter) discloses an aqueous pigment dispersion for paper coating, wherein said dispersion comprising a water-soluble polymer which serves as a dispersant for the pigment and the pigment includes kaolin, titanium oxide and calcium carbonate (abstract). The polymer is prepared from monomers that contain at least one carboxylic acid group-containing monomer such as (meth)acrylic acid and may further contain at least another monomer selected from a group that includes alkyl (meth)acrylates (which correspond to the claimed "water insoluble monomers"), dimethylaminoethyl (meth)acrylate (which corresponds to the claimed "unsaturated ester"), vinylpyrrolidone, vinyl acetate, styrene, alpha-methylstyrene, and acrylamide (col. 4, lines 26-44). The amount of the polymer in the dispersion is 0.1-1.5 wt% based on the dry weight of the pigment (col. 5, lines 41-43). The preparation of the dispersion involves crushing and grinding (col. 2, lines 17-28).

17. Although the prior art polymer is not produced by the process recited in the claims, Gonnet meets all the requirements of the claims for the same reason set forth in paragraph 14 above.

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

20. Claims 41-44, 47-49, 52-63, 66-73, 76-78, 81-92 and 95-107 are rejected under 35 U.S.C. 103(a) as being unpatentable over Egraz et al. (5,432,238; hereafter referred to as '238) in view of Couturier et al. (WO 2004/014926). *Notes: US 2006/0142511 is being used as an English equivalent as WO 2004/014926.*

21. Regarding the limitations set forth in these claims, '238 discloses a process of preparing an aqueous pigment/mineral filler dispersion for use in paper coating, paints and plastics, wherein the process comprising adding a water-soluble acrylic (co)polymer, which serves as a grinding aid or a dispersant, to an aqueous suspension of the pigment/mineral filler (col. 2), and wherein said (co)polymer comprises at least one carboxylic acid group-containing monomer such as (meth)acrylic acid and, optionally, at least one comonomer selected from a group that includes acrylamide, alkyl esters of (meth)acrylic acid, dimethylaminoethyl methacrylate, vinylpyrrolidone, vinyl acetate, styrene, and alpha-methylstyrene (col. 3, lines 44-63). The carboxylic acid sites on the (co)polymer are neutralized to an extent of 40-60% (abstract). *The (co)polymer is prepared by conventional radical polymerization in the presence of a hydroxylamine regulator and in the presence of a polymerization catalyst such as*

peroxides and persalts (col. 3, lines 44-50). *The main objective being sought is an acrylic-based grinding aid/dispersant that allows effective grinding/dispersion of a highly concentrated aqueous pigment/mineral filler suspension (i.e., at least 70 wt% dry matter) using a small amount of the grinding aid/dispersant such that the viscosity of the dispersion "remains substantially the same over time."* (col. 2). The pigment/mineral filler includes calcium carbonate, calcium sulfate, kaolin, titanium oxide and others (col. 5, lines 65-68). The amount of the (co)polymer added to the suspension is 0.2-2 wt% based on the dry weight of the pigment/mineral filler (col. 5, line 56).

22. It is clear that '238 teaches all the limitations set forth in these claims but fails to teach controlled free radical polymerization using the claimed alkoxyamine.

23. Couturier et al. (Couturier, hereafter) discloses a method of preparing a polymer via controlled radical polymerization using an alkoxyamine as a radical initiator. The alkoxyamine reads on the claimed alkoxyamine [0054]. The polymer comprises those prepared from a wide variety of monomers, including unsaturated acids such as (meth)acrylic acid, itaconic acid, maleic acid; vinyl species such as vinylpyridine and vinylpyrrolidone; numerous derivatives of (meth)acrylic acid such as alkoxy-terminated PEG (meth)acrylate; derivatives of (meth)acrylamide; and others (claim 8).

[Motivations] The disclosed method is said to provide a high but controllable rate of polymerization and provides excellent control of the polydispersity [0002-0004], especially for polymers comprising alkyl (meth)acrylates.

24. In light of such benefits, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have employed the alkoxyamine

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taught by Couturier as a radical initiator/regulator in the preparation of the (co)polymers taught by '238 so that the molecular weight and polydispersity can be better controlled and, as a result, the dispersion/suspension can have a high load of the mineral substances while the viscosity is well under control.

25. Claims 41-44, 47-49, 52-63, 66-69 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Egraz (above) or Gonnet (above) in view of Couturier (above).

26. From the discussion in paragraphs 13 and 16 above, it can be seen that each of Egraz and Gonnet discloses all the limitations set forth in these claims but fails to teach controlled free radical polymerization using the claimed alkoxyamine.

27. From the advantages of the controlled polymerization process taught by Couturier as discussed in paragraph 23 above and since Egraz and Gonnet each is looking for an acrylic-based grinding aid/dispersant that allows effective grinding/dispersion of a highly concentrated aqueous pigment/mineral filler suspension using a small amount of the grinding aid/dispersant such that the viscosity of the dispersion remains substantially constant over time, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have employed the alkoxyamine taught by Couturier as a radical initiator in the preparation of the polymers taught by Egraz or Gonnet so that the molecular weight and polydispersity can be better controlled and, as a result, the resulting dispersion/suspension can have a high load of the mineral substances while the viscosity is well under control.

Other Prior Art References

28. The following prior art references are herein made of record as they are highly relevant to the subject matter being claimed in the instant application: U.S. Pat. No. 5,432,239, U.S. Pat. No. 4,503,172, U.S. Pat. No. 4,840,985, U.S. Pat. No. 4,868,228, U.S. Pat. No. 4,845,191 and EP 129329 A2.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vu Nguyen whose telephone number is (571)270-5454. The examiner can normally be reached on M-F 7:30-5:00 (Alternating Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu can be reached on 571-272-1114. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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